Technical Attachment

AWIPS Issues Related to Activation of GOES-12 as GOES East

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1. Background

Since 1994, GOES-8 has been the operational GOES East satellite, stationed at 75°W. It has exceeded its five-year operational life expectancy by well over three years, and GOES-8 now lacks fuel for continued station-keeping maneuvers (other than for final ejection from geostationary orbit) and some of its subsystems have degraded. Therefore, GOES-12 (formerly called GOES-M and having been "stored in space" since its launch) is scheduled to replace GOES-8 as the GOES East satellite on or about April 1, 2003, at approximately 1730 UTC.

The imager on GOES-12 differs from those on the current GOES East and West spacecraft and, consequently, some AWIPS changes will be activated when GOES-12 becomes operational. This summary describes, in general terms, the upcoming changes. More details of the changes will be provided in the form of engineering notes.

2. Differences Between the GOES-8 and GOES-12 Imagers

The imagers on GOES-8, 9, 10 and 11 are essentially identical, so since 1995 both GOES East and GOES West have had matching imagers from the satellites in this series. The imagers on GOES-12 and the yet-to-be-launched GOES-N are different from those of the GOES-8 through 11 series. The differences are described in some detail at:

http://www.oso.noaa.gov/goes/goes-calibration/change-channels.htm

In brief, the differences between the GOES-12 and GOES-8 to 11 imagers are as follows:

- The resolution of the GOES-12 water vapor channel (i.e., channel 3) is 4 km, as opposed to 8 km in the pre-GOES-12 satellites.
- The central wavelength of the GOES-12 water vapor channel is 6.5 μm, as opposed to 6.7 μm in the earlier satellites. The spectral response of the GOES-12 water vapor channel is also wider than those of GOES-8–11.
- Channel 5 (the 4km resolution 12 μm channel on pre-GOES-12 satellites) is replaced on GOES-12 by channel 6 (a new 8km resolution channel centered at 13.3 μm).

Some "AWIPS sectors" of GOES imagery are supplied, on the SBN, at reduced resolutions and will not be affected by the imagery channel resolution changes.
From the perspective of AWIPS, the activation of GOES-12 will be most apparent in the imagery

received at GOES East AWIPS sites. NESDIS provides other GOES products to AWIPS, including soundings, SPEs and - in OB2 - high-density winds. GOES-12–related changes to these three products are expected to be very subtle, and such changes to these products are not described here.

3. Discontinued and Canceled GOES Imagery

For a period of time, likely several years in duration, GOES-12 is expected to operate in conjunction with an older-type GOES West (i.e., initially GOES-10 and later GOES-11). Creation of the hemispheric composites of channel 5 (12 µm) will no longer possible since GOES-12 lacks that channel, so AWIPS users should expect that product to be discontinued when GOES-12 becomes operational. Furthermore, when GOES-12 becomes operational, two-satellite composites of 3.9 µm imagery will be discontinued. Specifically, the imagery to be discontinued from the SBN GOES channels will be the Northern Hemisphere [World Meteorological Organization (WMO) headers TIGF03 and 04] and the SuperNational (WMO headers TIGN03 and 04) composites. These large-scale composites are typically displayed when users browse imagery in the "North American" and "Northern Hemisphere" D-2D map scales. Satellite imagery at the CONUS scale (and smaller D-2D scales) will still be available for every channel the GOES imager supports.

4. AWIPS Site Software Changes

Changes to the AWIPS site configuration will be needed at most sites around the time GOES-12 replaces GOES-8. The specific steps to be taken by each site depend upon several factors:

a. the GOES satellite in use (East or West) at the site,
b. the AWIPS release running at that site (5.2.2.x or OB1),
c. for 5.2.2 sites, the host machine of the Satellite Decoder (i.e., either DS1 or PX1), and
d. for 5.2.2 sites, the duration of time between GOES-12 activation and the site's scheduled OB1 upgrade.

The details of the steps to be taken around the time of GOES-12 activation will be provided in engineering notes. These notes will be distributed during March or with each site's OB1 upgrade package. The GOES-12 activation steps are summarized below, in very general terms, for each major category of sites.

Case 1 -Release 5.2.2 Sites using GOES East

These sites will execute phases I and II of the GOES-12 patch. A brief description of this patch appears below in section 5. Detailed instructions on the execution of this patch will be provided to sites by OOS in March 2003. Running the patch will involve executing scripts and relocalizing each workstation and the DS1 (or the PX1, if it has been installed and activated). See note below.

Case 2 - Release 5.2.2 Sites using GOES West

These sites will execute phase II of the GOES-12 patch. A brief description of this patch appears below in section 5. Detailed instructions on the execution of this patch will be provided to sites by OOS in March 2003. Running the patch will involve executing scripts and relocalizing each workstation and the DS1 (or the PX1, if it has been installed and activated). See note below.

Case 3 - OB1 Sites using GOES East

Upon GOES-12 activation a revised version of the GOESImagerInfo.txt file will be provided. Sites will then relocalize their workstations and PX1 machines with the -tables option. Some elaboration on this procedure appears in section 6, below.

Case 4 - OB1 Sites using GOES West

While no action is required at these sites, staff at these sites should be made aware of GOES-12 activation for a number of reasons. Although GOES-West-oriented AWIPS sites will continue to rely primarily on GOES-10, the GOES West SBN feed also provides composites based partly on GOES East imagery and D-2D uses those composites for "filling in" gaps where GOES West sectors incompletely fill the selected map. Thus, GOES West users might detect subtle differences in the SBN-provided satellite imagery when GOES-12 is activated.

If a GOES West site at OB1 decides to switch to GOES East, that site should carry out the operations described in case 3, above (i.e., in addition to other satellite-switching procedures).

Note: Any 5.2.2 sites that - at the time of GOES-12 activation as GOES East - are within a few days of their scheduled OB1 upgrade might consider skipping the execution of the GOES-12 site patch. However, for GOES East sites, the consequence of skipping the patch execution will be that the new 13µm imagery will not be displayable in D-2D until the OB1 upgrade takes place.

5. The GOES-12 Patch (to be used by 5.2.2.x sites ONLY)

Section 4 above refers to the GOES-12 patch. This software patch consists of a collection of scripts that transition AWIPS sites between the old and new imager environment. The GOES-12 patch was provided to sites by NGIT in December 2001. It was placed in the following directory: `/data/local/GOES12_SEC_A100154` and is reachable from, e.g., DS1. The patch consists of approximately 12 scripts which exist, in tar'ed form, in the following file: `GOES12_SEC_A100154.tar`. This patch is to be used by most 5.2.2[.x] AWIPS sites around the time of GOES-12 activation. Sites at OB1 should not use this software patch, but instead should use localization - as described in section 6 below.

Execution of the GOES-12 patch will modify configuration files related to satellite imagery ingest, display, store, monitor and purge. Instructions for running this patch will be provided to sites in March 2003. Sites using GOES East will carry out instructions corresponding to phase I and then (later) phase II of the patch. Sites using GOES West will carry out instructions corresponding to phase II only. Phase I of the patch scripts should be executed within a few days

of the GOES-12 activation as GOES East. Phase II of the patch scripts should be executed several days after the activation of GOES-12 as GOES East.

6. Localization to Resolve GOES Imager Type (new feature for OB1)

As described below, localization will be used by OB1 sites to modify their AWIPS environments to be compatible with GOES-12.

AWIPS relies on localization to select the appropriate configuration files for a site (i.e., either GOES East or GOES West files). Examples of such configuration files include /data/fxa/nationalData/satProductButtons.txt and westSatDataInfo.template. By default, localization activates GOES West configuration files for sites west of 100°W longitude and it activates GOES East configuration files for sites east of that longitude. This default can be overridden with the SATEW localization directive. Localization records (in the localization log, /data/logs/fxa/localization.log) the GOES satellite with which a site has been associated. For example:

```
...
running assembleTables.csh
Using EAST satellite.
...
```

The log excerpt above indicates that localization has associated this site with GOES East, and has activated the corresponding configuration files. These features are not new to AWIPS.

Beginning with OB1, localization has been extended to consult an additional configuration file to determine the imager type on the GOES satellite it has just associated. The configuration file is:

`/data/fxa/nationalData/GOESImagerInfo.txt`

This file stores the generation of the imagers aboard the two currently-operational GOES satellites. GOES-8, -9, -10, and -11 have a first generation imager, GOES-12 has a second generation imager, etc. As described above, the localization process will first associate a site with a GOES satellite (i.e., either East or West). Subsequently, localization will check the GOESImagerInfo.txt file to ascertain the type of imager on that satellite. Localization will use this information, in turn, to select the correct D-2D Satellite menu for that site. Most sites use the AWIPS national baseline satellite menu files:

`/data/fxa/nationalData/ijklSatDatamenu.txt` (corresponds to GOES-8 – GOES-11)
`/data/fxa/nationalData/mnopqSatDatamenu.txt` (corresponds to GOES-12 and future GOES)

Around the time of GOES-12 activation as GOES East, OB1 sites will be provided with a revised version of the GOESImagerInfo.txt file. GOES East sites at OB1 will then relocalize PX1 and their workstations (using the -tables option) to activate the appropriate configuration files.

Sites may override the national baseline satellite menu files (in the nationalData directory) with site-local files stored in /data/fxa/customFiles or /awips/fxa/data/localization/<siteID>. For example, in the pre-OB1 era, site LWX could establish a file called LWX-satDataMenus.txt. In

the OB1 era such files should be replaced with files named as follows:

a. LWX-ijklSatDatamenu.txt (oriented toward GOES-8 through GOES-11)

b. LWX-mnopqSatDatamenu.txt (oriented toward GOES-12 and later satellites).

The contents of these menu files should correspond to the generation of imagers on the satellites with which the files are associated. For example, 12µm entries should appear only in <siteID>-ijklSatDatamenu.txt, whereas 13µm entries should appear only in <siteID>-mnopqSatDatamenu.txt.

7. Schedule Summary

- GOES-12 imager/sounder reactivated - Jan 16, 2003.
- GOES-12 Calibration/Navigation activated - Jan 24, 2003.
- GOES-8–to–GOES-12 switchover - April 1, 2003 (GOES-12 near 81°W longitude). AWIPS sites should allocate several hours to execute the GOES-12 activation steps and conduct monitoring on or near this date.
- GOES-12 reaches GOES East station (75°W longitude) by about April 22, 2003.

Refer to the figure at the end of this document for GOES-12 satellite position information.

8. References

1. Information on the current GOES-12 imager and sounder schedules can be found at the URL below. Please note that the GOES-12 imager will be primarily in Full Disk mode during this pre-operational period. When activated as GOES East, GOES-12 will be switched to the routine and on-request rapid-scan modes to which GOES-8 users have become accustomed.

http://www.ssd.noaa.gov/PS/SATS/GOES/EAST/g12sched.html

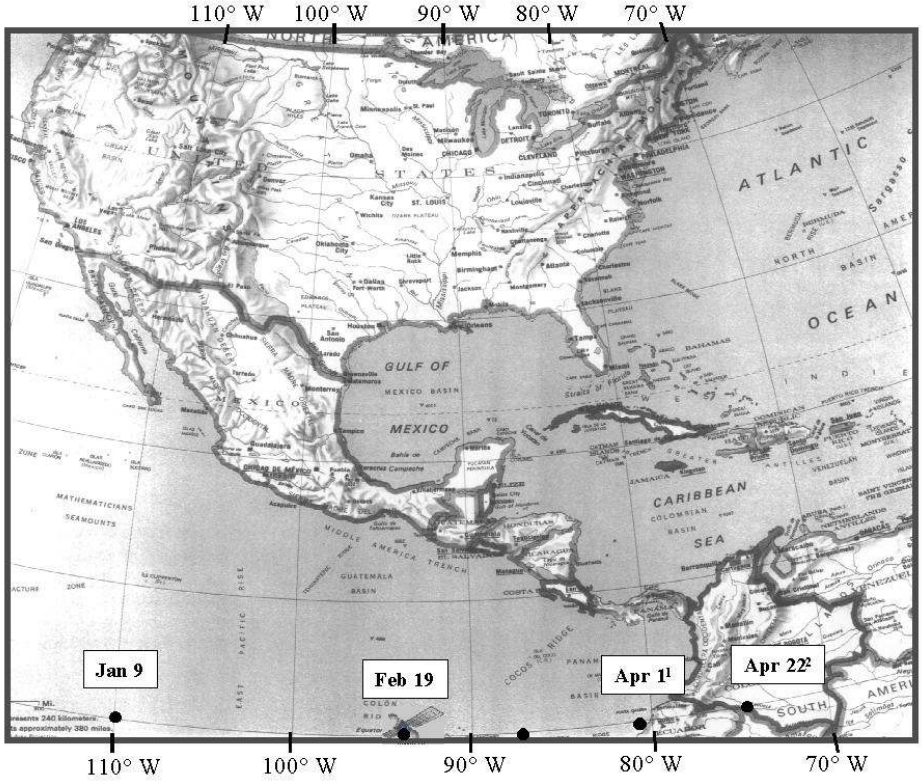
2. GOES East Dissemination schedules and scanning strategies are described at the URL below. Please note that the scanning strategies reflect the full (raw/GVAR) sectors. The AWIPS (SBN) sectors are extracted from these larger sectors.

http://www.ssd.noaa.gov/PS/SATS/GOES/EAST/sched.html

3. Links to the NESDIS GOES-8 to -12 transition plan appear at:

http://www.oso.noaa.gov/goes/index.htm

Approximate GOES-12 Positions - Early 2003



Notes

1. GOES-12 activated as GOES East, replaces GOES-8 (April 1, 2003).

2. GOES-12 arrives at permanent GOES East station, 75°West (roughly April 22, 2003).

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